149

NIGERIA

ANNUAL REPORT

ON THE

MEDICAL RESEARCH INSTITUTE

FOR THE YEAR

1929.

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APPENDIX A.

ANNUAL REPORT OF THE MEDICAL RESEARCH INSTITUTE, 1929.

BY

ANDREW CONNAL, M.D., D.P.H., D.T.M. AND H.
Director of Medical Research Institute.

MEDICAL RESEARCH INSTITUTE,
YABA (VIA LAGOS), NIGERIA,
25th March, 1930.

SIR,

I have the honour to present the Annual Report for 1929, which has been condensed as much as possible.

2. Rat plague, as will be seen, shows signs of diminishing intensity.

3. Regarding blackwater fever, it is known that at least three additional cases occurred, the details of which have not yet been obtained. Nevertheless, the total is the lowest for some years.

4. Dr. E. C. Smith continued his dermatological research and he also contributes the notes on intranuclear changes in the liver in yellow fever, the histological findings in a case of blackwater fever, and the paragraph on rabies.

5. Dr. J. A. Young, M.C., devoted his whole attention to " diarrhoea and dysentery ".

6. Dr. S. L. M. Connal, M.B.E., presents the usual Entomological report.

7. Dr. B. G. T. Elmes contributes the note on neoplasms.

I have, etc.,
A. CONNAL,
Director of Medical Research Institute.

THE HONOURABLE
THE DIRECTOR OF MEDICAL AND SANITARY SERVICE,
LAGOS.

RAT PLAGUE.

The number of rodents examined in Lagos during 1929 was 75,853, of which 430 were plague-infected. These figures show a slight increase in the number of rodents caught and a marked diminution in the number infected with plague. Table I gives the figures since the beginning of the plague epidemic in 1924.

TABLE I.

Year.	Rats examined.	Rats infected.	Infection-rate.
1924 (last six months)...	6,348	147	1 in 43
1925	36,370	273	1 in 133
1926	42,830	1,020	1 in 42
1927	57,049	676	1 in 84
1928	75,639	1,214	1 in 62
1929	75,853	430	1 in 176
Five and a half years ...	294,089	3,760	1 in 78

The increased number of rats caught each year is a tribute to the efficiency of the measures used, particularly when it is remembered that the longer the war is waged against them the more wary and cunning the rats become. There is some reason, however, to believe that the fecundity of the rat increases to make good the wastage suffered from plague. This is demonstrated in Chart I in which the blue curve represents the average monthly percentage of *pregnant* rats and the red curve shows the average monthly percentage of *plague-infected* rats over the three years' period 1927-1929. From this chart it is seen that plague-infection is most prevalent in the last quarter of the year, and the number of pregnant rats is highest in the second quarter of the year.

The total of 75,853 rodents examined is made up of 71,027 black rats (*Rattus rattus*), 2,906 brown rats (*Rattus norvegicus*), 1,878 " swamp " rats (*Dasymys rufulus*) and forty-two " bush " rats (*Cricetomys gambianus*). In addition to these, 3,057 shrews (*Crocidura manni*) were examined.

Plague infection was almost entirely confined to the black rats. There were only four infected amongst the brown rats and one in the " swamp " rats. The " bush " rats and the shrews were negative.

The disease in the rats showed its usual seasonal prevalence, there being a comparative lull from March to August and a sharp rise in September to a peak in October. As compared with the previous two years, the weekly curve of percentage rat-infection in 1929 followed that of 1927 more closely than it did that of 1928.

Chart II shows the monthly percentage of infected rats, as a graph, compared with the three previous years 1926, 1927 and 1928.

The sources of the rats were (1), collecting stations (these, of which there were three, were closed down on 12th October); (2), rat-catchers (3), spray-gangs and (4), Port Health Office. The collecting stations supplied 280 positive rats, the rat-catchers, 131; the spray-gangs, fourteen and the Port Health Office, five.

All the infected rats were adults except in the case of thirty-eight which measured less than five inches from the snout to the root of the tail.

The rats were examined in the manner detailed in previous reports, that is, given a serial number, pinned belly uppermost on a board, with a glass slide bearing the same serial number, a skin incision made from chin to pubis, the skin dissected back, buboes in neck, axilla and groin looked for, then the abdomen and chest opened and the organs exposed. Smears were made of all swellings and of suspected organs and in any case a spleen smear was made from every animal.

The usual signs of plague infection were noted, as under :—

General congestion.—The commonest sign, present in 415 or 96.5% as compared with 92% in 1928.

Pleural effusion.—This was observed in 387 cases or 90% as compared with 79% in 1928. The effusion was haemorrhagic in sixty-five of these cases.

The Liver.—The naked-eye appearance of this organ was noted in 424 cases. As compared with 1928, it will be observed that the " speckled " liver is much more common, an indication probably of a decline in the virulence of the disease, the " speckled " liver being a later stage of the " mottled ". Table II gives the details.

TABLE II.

	1928.	1929.
Mottled	534=43·98 *per cent.*	139=32·32 *per cent.*
Speckled	232=19·11 ,, ,,	198=46·04 ,, ,,
Normal	115= 9·47 ,, ,,	17= 3·95 ,, ,,
Pale	29= 2·38 ,, ,,	5= 1·16 ,, ,,
Congested	28= 2·30 ,, ,,	7= 1·62 ,, ,,
Putrid	276=22·73 ,, ,,	64=14·88 ,, ,,

The Spleen.—This organ was congested and enlarged in all the cases in which putrefaction had not destroyed the appearances. A " speckled " spleen was noted in only two cases. In both instances the liver also was speckled. There were bilateral cervical buboes in one case and a mesenteric bubo in the other.

The suprarenals were congested in 335 cases or 77.90% as compared with 520 or 42.75% in 1928.

Intestinal haemorrhage was noted in twenty-nine cases or 6.74% as compared with 135 or 11.12% in 1928. In 1927 one case in seven showed the lesion, in 1928 there was one case in nine, and in 1929 there was one case in fifteen. Table III shows the site of the bubo in the cases which had intestinal haemorrhage.

TABLE III.

	1928.	1929.
No bubo	16	3
Cervical	72	13
Cervical and axillary ...	2	2
Cervical and groin	1	—
Axillary	9	2
Axillary and lumbar ...	1	—
Groin	5	1
Groin and lumbar	11	2
Groin, pelvic and lumbar ...	1	—
Pelvic and lumbar	3	—
Lumbar	11	1
Mesenteric	3	5

Subcutaneous haemorrhages were not an outstanding feature. They were observed in the cervical region in twenty-eight and in the flanks in twenty-four but a proportion was probably due to injury. Haemorrhage was only once seen in the axillary region.

Buboes.—These occurred in 398 cases. Thirty-two rats were " returned " as showing no bubo. Four are definitely noted as " missed at PM " which indicates that general congestion, pleural effusion, congestion and enlargement of the spleen and alteration in the appearance of the liver were not sufficiently obvious to the naked eye to attract suspicion.

Five cases were noted as " very putrid " and in two cases the head of the animal was missing. Therefore, it is possible that in eleven cases a bubo was present but was not or could not be observed. In the remaining twenty-one cases the usual signs of plague were observable by the naked eye and it may be accepted that a bubo was definitely absent.

The bubo was single in 233 cases, the site being cervical in 178, axillary in twenty-six, groin in ten, lumbar in ten and mesenteric in nine.

The buboes were bilateral in one region in 110, the situation being cervical in 109 and lumbar in one.

The sites were multiple in fifty-five cases as follows :—

Cervical and axillary in seven; cervical and lumbar in three; cervical, groin and lumbar in two; cervical, axillary, groin and lumbar in one; axillary and lumbar in one; axillary, groin, pelvic and lumbar in two; groin and lumbar in twenty-seven; groin, pelvic and lumbar in five; and pelvic and lumbar in seven.

The cervical region is therefore the most common site, a bubo occurring there in 300 cases. The next commonest site is the lumbar, (fifty-nine), followed by the groin (forty-seven), axillary (thirty-seven), pelvic (fourteen) and mesenteric (nine). Table IV shows the figures for the period October, 1926, to December, 1928 compared with those for 1929.

TABLE IV.

1926–28—2,224 rats.			1929—430 rats.		
Single buboes ...	1,201	54·00 *per cent.*	Single buboes ...	233	54·16 *per cent.*
Multiple buboes ...	557	25·04 ,,	Multiple buboes ...	165	38·37 ,,
Bubo absent ...	466	20·95 ,,	Bubo absent ...	32	7·44 ,,

Table V shows the comparison as regards the frequency of the different buboes.

TABLE V.

	Total.		In combination.	
	1926–28.	1929.	1926–28.	1929.
Cervical ...	1,219	300	94=7·71 *per cent.*	13=4·33 *per cent.*
Axillary ...	239	37	67=28·03 ,,	11=29·72 ,,
Groin	292	47	222=76·02 ,,	37=78·72 ,,
Pelvic	86	14	57=66·27 ,,	14=100·00 ,,
Lumbar	208	59	147=70·67 ,,	48=81·35 ,,

Table VI shows the proportion of right-sided to left-sided buboes, where the bubo was single, as compared with 1928.

TABLE VI.

		1928.	1929.
Cervical	right	268=55·03 *per cent.*	105=59·32 *per cent.*
	left	219=44·96 ,,	72=40·67 ,,
Axillary	right	49=52·12 ,,	18=66·66 ,,
	left	45=47·87 ,,	8=33·33 ,,
Groin	right	11=78·57 ,,	4=40·00 ,,
	left	3=21·42 ,,	6=60·00 ,,
Pelvic	right	3=100·00 ,,	——
Lumbar	right	27=65·85 ,,	7=77·77 ,,
	left	14=34·14 ,,	2=22·22 ,,

It should be noted, with regard to the above figures that one cervical bubo and also one lumbar bubo are omitted, as no note was made of the side of the body on which they occurred. The actual disposition of the buboes in their order of frequency is given below.

Bilateral cervical ...	109
Right cervical	105
Left cervical	72
Right axillary	18
Right groin and lumbar ...	13
Left groin and lumbar ...	10
Mesenteric	9
Left axillary	8
Right lumbar	7
Left groin	6
Right pelvic and lumbar ...	6
Right groin	4
Right cervical and axillary	4
Right cervical and lumbar...	3
Left groin, pelvic and lumbar	3
Left lumbar	2
Left cervical and axillary	2
Bilateral groin and lumbar	2
Right groin, pelvic and lumbar	2
Bilateral lumbar	1
Right axillary and lumbar	1
Left pelvic and lumbar	1
Right axillary, left groin, pelvic and lumbar ...	1
Left axillary, groin, pelvic and lumbar... ...	1
Bilateral groin and left lumbar	1
Left cervical, right groin and bilateral lumbar ...	1
Bilateral cervical, right groin and lumbar ...	1
Right axillary and left cervical	1
Left cervical and axillary, bilateral groin and lumbar	1
Right groin and left lumbar	1

One cervical and one lumbar bubo are omitted from the list for the reason already given.

The occurrence of mesenteric buboes is interesting. It was stated in a previous report (" Intestinal haemorrhage in rats suffering from septicaemic plague, considered as a factor in the spread of human pneumonic plague ", Connal and Paisley, Trans. Roy. Soc. Trop. Med. and Hy. XXI 4, pp. 289-294) that no evidence of a primary alimentary source of the plague infection in the rats was obtained. Further, A. N. Goyle in " a brief report of the plague research work carried out in the United Provinces in 1928 " (summarised in " The Indian Medical Year 1928 ") states " we have not found any rat dead of acute plague with a mesenteric bubo " and again " nor is there any evidence of the rats contracting acute plague in nature by feeding on the carcasses of chronic or acute plague rats ".

As will be seen from Table VII a mesenteric bubo has been found in nine plague rats in which intestinal haemorrhage was also present. In 1927 there were three cases of mesenteric bubo, in 1928 there were six, and in the present year (1929) there were nine. The proportion of mesenteric buboes associated with intestinal haemorrhage is high, being one in three in 1927; three in six in 1928; and five in nine in 1929. It will be noted also, from Table VII that in 1927 there were eleven cases of intestinal haemorrhage in which no bubo was found, in 1928 there were sixteen and in 1929 there were only three. It is possible that had more careful search of the mesentery been made in 1927 and in 1928, some of the cases classed as showing no bubo might have been shown to have a mesenteric bubo.

As noted in a previous report, attempts to infect rats with plague by feeding infective material failed, but it is by no means certain that infection cannot occur by the alimentary route, in nature. It is possible also that intestinal infection may follow as the result of the rat crushing and swallowing plague-infected fleas.

TABLE VII.

SHOWING THE SITE OF THE BUBO IN 255 CASES OF INTESTINAL HAEMORRHAGE.

	1927.	1928.	1929.	Total.
Cervical	56 (359)	72 (701)	13 (287)	141
Axillary	5 (49)	9 (113)	2 (26)	16
Groin and lumbar ...	...	11 (87)	2 (27)	13
Lumbar	...	11 (56)	1 (11)	12
Mesenteric	1 (3)	3 (6)	5 (9)	9
Groin	1 (24)	5 (33)	1 (10)	7
Groin and pelvic	7 (55)	...	...	7
Cervical and axillary ...	1 (10)	2 (18)	2 (7)	5
Pelvic and lumbar ...	1 (3)	3 (15)	...	4
Pelvic	4 (27)	...	...	4
Cervical, groin and pelvic ...	2 (12)	...	...	2
Cervical and groin ...	1 (5)	1 (4)	...	2
Cervical and lumbar ...	1 (3)	...	...	1
Axillary and lumbar ...	...	1 (8)	...	1
Groin, pelvic and lumbar ...	...	1 (7)	...	1
No bubo	11 (98)	16 (138)	3 (32)	30
Total ...	91 (676)	135 (1,214)	29 (430)	255

Microscopic.—All smears were stained with freshly-prepared carbol thionin blue, which has been found to be the simplest and most reliable stain to use for the purpose of showing up the bi-polarity of the plague organism, *Pasteurella pestis.* The diagnosis, in every case was made only after microscopical examination. No doubtful cases were encountered which required culture on artificial media, or animal inoculation.

In three cases an abscess was found, once in the cervical region, once in the groin and once in the abdominal wall adherent to the spleen. Smears from these showed no *P. pestis* and inoculation of guinea-pigs was negative.

ECTOPARASITES OF LAGOS RODENTS.

The commonest ectoparasite found on the rats was *Xenopsylla cheopis*, of which flea 4,864 specimens were obtained. Next in frequency was *Xenopsylla brasiliensis* of which there were 1,681 examples. Only two other kinds of flea were met with, and these rarely, namely *Ctenocephalus canis*, three specimens and *Echidnophaga sp.* also three specimens. *Laelaps echidninus* numbered 501 and there were 112 examples of *Haematopinus sp.* In addition to these, the larvae of *Cordylobia anthropophaga* were not infrequently seen.

Accurate flea-counts were obtained from 493 live rats.

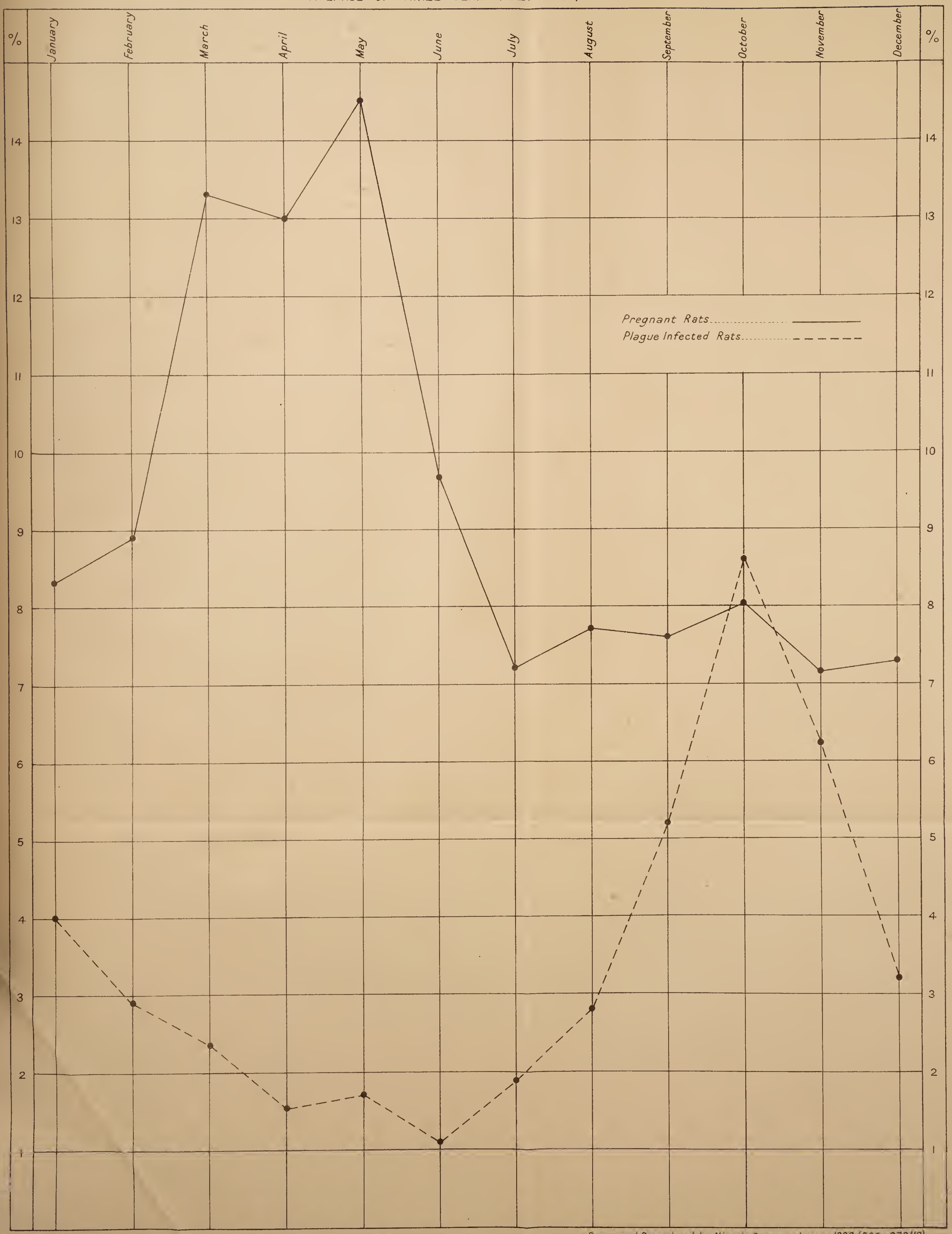
The average number of fleas per rat per month only twice exceeded five. the figures being 5.41 (sixty-eight rats) in March and fifteen (two rats) in October. The actual figures are given in Table VIII.

TABLE VIII.

	Rats.	Fleas per rat.
January	86	2.10
February	15	2.66
March	68	5.41
April	50	3.98
May	26	4.07
June	67	2.50
July	21	3.33
August	22	3.18
September	23	4.04
October	2	15
November	58	3.41
December	56	3.07

Chart No. 1

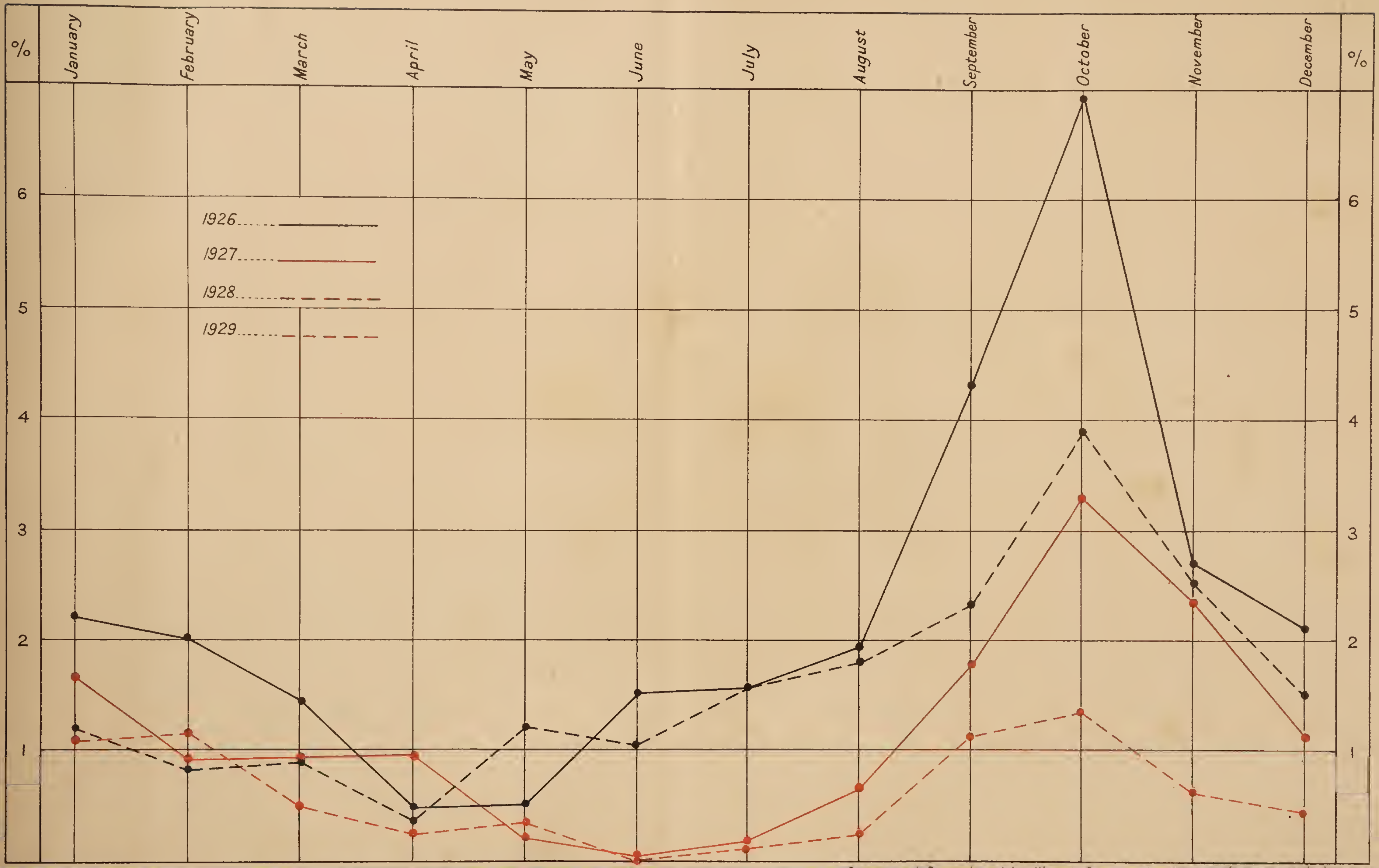
Monthly Percentage of Pregnant and Plague – Infected Rats
Average of Three Years (1927-1929)



Drawn and Reproduced by Nigeria Surveys, Lagos, 1930 (366-370/10).

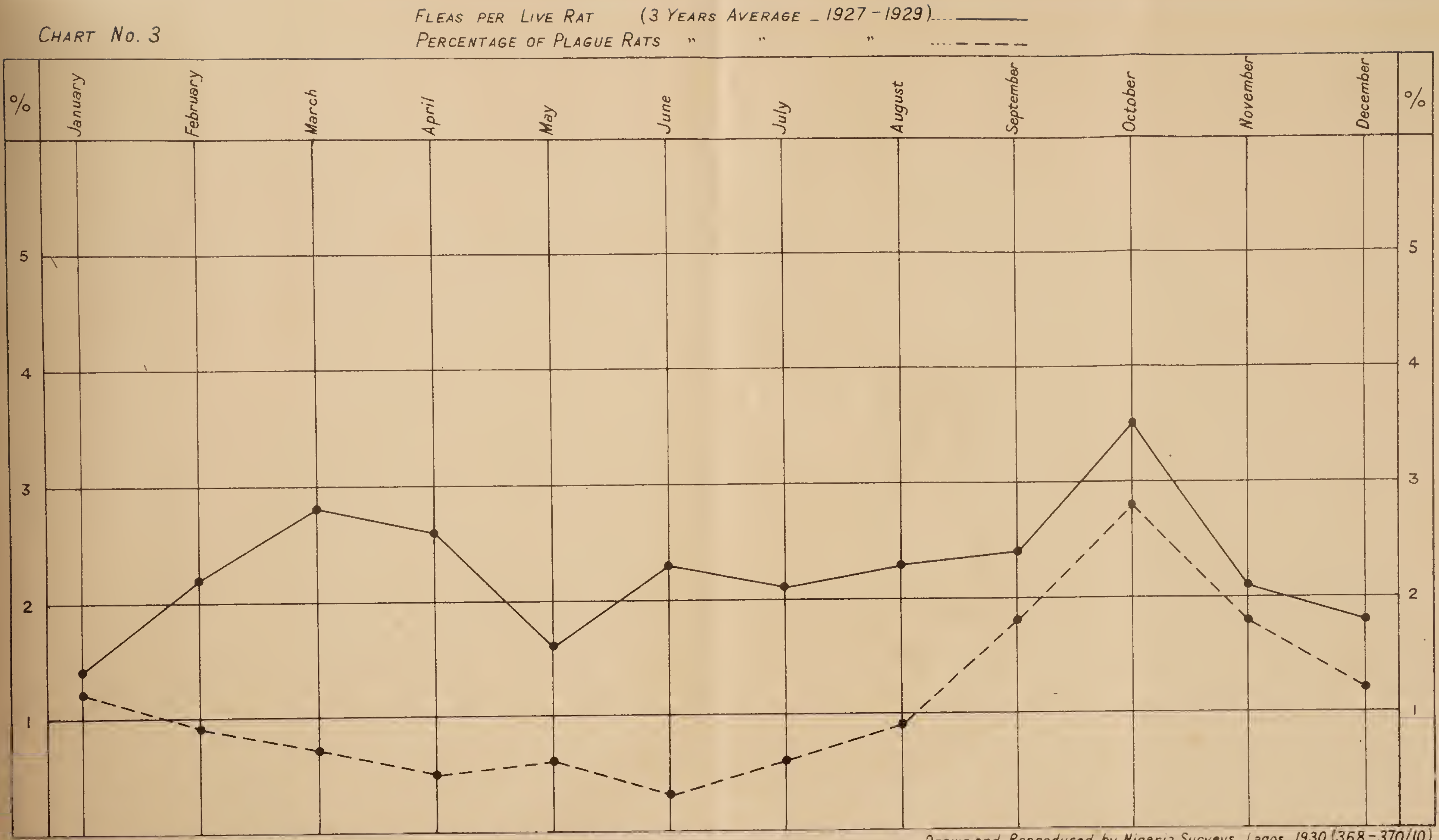
CHART No. 2

MONTHLY AVERAGE PERCENTAGE OF PLAGUE RATS



Drawn and Reproduced by Nigeria Surveys, Lagos, 1930 (367 - 370/10).

CHART No. 3



Drawn and Reproduced by Nigeria Surveys, Lagos, 1930 (368 - 370/10).

The highest daily flea-count in each month was—

January	11·5	February	7·66	March	26
April	17	May	14·66	June	9
July	12	August	10	September	15
October	25	November	22·25	December	8

The highest weekly flea count in each month was—

January	2·40	February	4·25	March	8·52
April	5	May	6·37	June	3·73
July	15·66	August	4·84	September	6·75
October	25	November	6·36	December	5·61

The number of rats on which no fleas were found was—

January	13	February	2	March	12
April	1	May	5	June	12
July	4	August	4	September	5
October	—	November	—	December	1

Xenopsylla cheopis was more numerous than *X. brasiliensis* in all weekly counts except once in February, (one rat in week ending 18th, one *cheopis*, two *brasiliensis*) once in March, (nine rats in week ending 25th 0.77 *cheopis*, 1.77 *brasiliensis*) once in May (six rats in week ending 27th, 0.50 *cheopis* 1.00 *brasiliensis*), once in October (one rat in week ending 7th, ten *cheopis*, fifteen *brasiliensis*) and once in November (nineteen rats in week ending 25th, 2.68 *cheopis*, 3.68 *brasiliensis*).

The relationship between the number of *X. cheopis* per rat per month and the percentage of plague rats per month is shown in Chart III. The figures are an average of three years, 1927, 1928 and 1929, in each case.

Fleas were also obtained from dead rats but their number cannot be accepted as representing an accurate estimate of the number of fleas per rat. All dead rats are brought to the laboratory in pails of disinfectant fluid and it was after sieving this fluid and washing the deposit that the flea count was made. The fleas, each day were calculated as per 100 rats and the monthly figures are seen in Table IX.

TABLE IX.

	Rats.	Fleas per 100 rats.
January	5,502	6.61
February	5,159	7.48
March	5,721	9.01
April	6,352	4.62
May	6,752	4.44
June	6,995	5.40
July	9,161	3.83
August	8,542	3.69
September	6,555	5.44
October	5,433	10.62
November	4,411	14.62
December	4,957	7.46

DERMATOLOGY.

The number of cases seen during the year at the out-patient department of the African Hospital has been extremely small. As mentioned in the previous report this is due in the main, to the frequent changes of staff and to the rebuilding of the hospital, which still continues. The staff changes were necessarily numerous in the first part of the year owing to the temporary acute shortage of Medical Officers. Natives are shy of men, however capable they may be, that are unknown to them and it requires a period of from six to twelve months before they begin to have confidence and before they will seek medical advice. Any falling off in the attendance will naturally be reflected in the number of dermatological cases seen.

Of those seen, the interesting conditions may be grouped into three categories.

(1) Streptococcal dermatitis;
(2) Ducrey infection (Bacillus of soft sore);
(3) Facial tuberculosis.

Streptococcal dermatitis.—Three common types of streptococcal dermatitis are seen in Lagos :—

(*a*) Eczematoid lesions;
(*b*) Bullous or vesicular lesions;
(*c*) Shallow ulcerations.

Eczematoid lesions.—The regions are inflamed and the skin is dry and presents numerous eroded areas through which can be glimpsed the underlying raw granulating surface. The area may be oedematous and a serous discharge ooze from the fissures. This discharge may become dry and form crusts similar to those seen in impetigo. More usually secondary infections are added causing considerable variations in appearance. Vesicles or small blebs may still be found at the periphery of such infected areas and will point to the true nature of the lesion.

Vesicular or bullous exanthemata.—This type is most marked in infants and is usually confined to the limbs when it may in its early form be mistaken for scabies. Later the vesicles increase in size and the resultant blebs become broken, giving rise to circular raw areas. Such areas rapidly become secondarily infected and ulceration commences.

Ulcerated lesions.—A neglected bullous eruption may frequently become ulcerated at the sites of the broken blebs. The ulcers are as a rule multiple, characteristically shallow, have raw granulating often purulent bases and well defined edges, later becoming irregular by extension. A clear serous exudate oozes continually from the surface of such ulcers.

Diagnosis.—Fluid from the vesicles or bullae when present, was aspirated by a capillary pipette and discharged into a sterile watch glass, an equal quantity of peptone water containing a few drops of blood serum was then added and after mixing, was again aspirated into the pipette. This was then sealed and incubated at 37°C for about ten hours. On examination a white flocculent mass was seen to occupy the lower part of the pipette and this was found microscopically to be composed of long chains of Gram-positive cocci. Subsequently plating out on blood agar showed that the organisms were actively haemolytic.

Treatment.—When not grossly contaminated, little was necessary beyond daily cleansing of the lesions in saline and the application of protective dressings.

Ducrey infections.—This is a condition requiring more investigation in Nigeria as it is capable of simulating granuloma inguinale to such an extent that a differential diagnosis becomes impossible without careful bacteriological and histological examination. It is very doubtful if true granuloma inguinale exists in Southern Nigeria. Investigation is rendered particularly difficult owing to the scarcity of such lesions, rendering it impossible to have a number of cases for examination at any one time. The clinical appearance varies with the duration, the initial lesion being the well known " soft sore ", or genital chancre, which may be single or multiple. Later the typical buboes appear in the groin and may prove very refractory to treatment. Such cases present no difficulty in diagnosis but it is when the condition has become ulcerative in type that difficulties will arise.

In the earlier forms these ulcers are obviously the result of broken down buboes and a careful microscopic examination of the discharge will usually reveal the small, Gram-negative pleomorphic organism of Ducrey.

In the older cases, the ulcer has spread serpiginously along the line of the inguinal ligament, possibly extending down on to the scrotum and encircling the lumbar region.

The serpiginous nature of the ulcer is characteristic, it has a raised hard edge, remains shallow with a tendency to undermining at the edges, and presents a moist red granulomatous base. The discharge is scanty and it may be exceedingly difficult to find the causative organism therein.

The following technique was found useful in diagnosis. After thorough cleansing of the ulcerated area with warm saline, it was gently scraped with a small curette and the tissue so obtained emulsified in a little sterile water. A small amount (0.5cc) was then inoculated intracutaneously into the patient's arm. Within three days a small indurated boil developed at the site of inoculation and on examination of the pus large numbers of the organism were found arranged intra-cellularly and in long strands. The pus was infectious for monkeys (*Macacus rhesus*) producing small indurated ulcers lasting a few weeks. Sections of the lesions in the human revealed a chronic infiltration, mainly of plasma-cells.

FACIAL TUBERCULOSIS.—Cases have occurred from time to time, arising within yaws-infested areas, of facial lesions, some papillomatous, others ulcerative in type, which have failed to respond to N.A.B. treatment. Various diagnoses were suggested including leishmaniasis, blastomycosis, tuberculosis and malignant disease. This year, it was possible to examine two such cases in detail. In one case, a young Lagosian girl, kindly sent for examination by Dr. Anders of Ogbomosho, the lesion occupied the greater part of the upper lip, including the mucous membrane and, involving both *alæ nasi* above, it extended symmetrically on either side of the nose to terminate in a raised crescentic hard edge. The area involved was thickened, indurated and raised above the surrounding skin. The surface was partly papillomatous, partly ulcerated. There was no ulceration of the mouth, palate or interior of the nose. From the girl's own statement, the condition had commenced as a small pimple on the upper lip six months previously. She had been given a course of N.A.B. (six injections) without any amelioration taking place in the lesion.

The second case, a boy aged ten years, was seen through the courtesy of Dr. Stephens (Ilorin). The lesion occupied the whole of the upper lip excepting the mucosa, both *alæ nasi* and extended laterally on either side of the nose, this extension being more marked on the right side.

The surface of the lesion was dry, inclined to scaliness and in places papillomatous. No ulceration of the palate or buccal mucosa. The boy, an intelligent Ebo, said that he had suffered from yaws and that the " sickness " began as a " yaws spot " in the nose. In the previous year the boy was given a prolonged course of N.A.B. His general condition improved greatly but the facial lesion remained in *statu quo*. He returned again after an absence of fifteen months—the lesion remaining much the same.

Histology.—In both cases, the salient feature histologically was the preponderance of well-formed giant-cells, lying embedded in the midst of a dense infiltration of round and plasma cells. In places, a suggestion of tubercle formation was noticed. Many sections of both cases were examined for organisms but in only two were acid-fast bacilli found and in both sections the organism was intracellular.

Animal inoculations.—From the first case, a small portion of tissue was removed from the growing edge and after washing in saline, was ground up in a little of the same material. Quantities of this emulsion, varying from $\frac{1}{4}$ to 1.0cc were inoculated subcutaneously into five monkeys (*Macacus rhesus*).

Within five weeks these animals presented irregularly raised bluish-red coloured nodules at the site of inoculation. On incision, a thick tenacious pus exuded which on being stained was found to be rich in acid fast bacilli. Some of this material was diluted in saline and inoculated into guinea-pigs with positive results.

Amongst the items which received attention during the year, mention might be made of—

(1) Sycosis nuchae;
(2) Pseudo-leprosy;
(3) Actinomyces;
(4) Intranuclear changes in yellow fever.

Sycosis nuchae.—This condition is common among natives and appears in its earlier form as a number of minute papules in the skin of the back of the neck. These papules emit pus on pressure which contains Gram-positive cocci. In the later stages, the papules are larger and may equal in size that of a pea. Fusion may occur and tufts of shortened hairs usually project from their centres. The final stage presents itself as a large raised keloid-like mass, the edge being irregular depending, as it does, on the fusion of pre-existing papules. The lesions are essentially chronic in their nature and treatment is of little avail except in the early stages.

The condition is regarded as resulting from a chronic infection of the hair follicles with pyogenic staphlyococci.

Pseudo-leprosy.—In the *West African Medical Journal* for July, 1928, a full description was given of this leprosy-simulating disease and during this year some good examples have been seen. Sections of the edge of one of these ringed lesions reveal the characteristic infiltration zones containing numerous well-formed giant cells. No acid-fast bacilli could be demonstrated. It is possible that the disease is a form of tuberculosis but experimental work will be necessary before any conclusions can be arrived at.

Actinomyces.—Though the closely allied fungi, the nocardia, seem to be distributed throughout Nigeria, no case has yet been recorded of a proven actinomycotic infection in the native. An indication that the causative fungus, pathogenic at least for animals, is present, is shown by the fact that a spontaneous infection was found in one of the rabbits kept for experimental purposes. The lesion was in the form of a small nodule situated in the subcutaneous tissues of the hind leg. On incision, yellowish coloured grains were easily discernible to the naked eye and when sectioned they appeared as radiating, intensely acid-fast masses showing marked branching and club formation. Cultures were attempted but were unsuccessful.

Intranuclear changes in the liver cells in yellow fever.—Since Torres first described the presence of intranuclear inclusions in hepatic tissue from yellow fever cases, many investigators have reported similar findings. Through the kindness of the Rockefeller Yellow Fever Commission, an opportunity was given to examine the livers of *Macacus rhesus* monkeys experimentally infected with the disease and which had succumbed, small portions of the liver being taken at intervals varying from five minutes to sixteen hours after death. The pieces were fixed in ordinary formalin, cobalt nitrate formalin, Zenker and watery Bouin. Though all the fixatives used gave good results, Bouin was finally adopted as giving the best results.

The stains used were haem. eosin, safranin, neutral red, light-green and Giemsa. The results with Giemsa staining were superior, particularly good differentiation being obtained by staining for twenty-four hours in five *per cent.* Giemsa, decolourising in five *per cent.* (or stronger) tannic acid solution until the sections changed from dark-blue to pink; washing in distilled water and then passing through graduated acetones to xylol. There are two nuclear changes noticeable. The one, a fragmentation or excess formation of chromatin (staining dark-blue with Giemsa), occurs in many conditions where liver cells are involved. The other is the presence of granular material (staining pink with Giemsa)—the " inclusions of Torres ", which are apparently specific to the disease. These changes are present without any diffuse staining of the nuclei such as seen in some necrotic phases. The hyperchromatism varies enormously in the different nuclei; one will show a dark-blue staining blob or mass at either pole; in another, the chromatin material is distributed in the form of small peripherally-arranged granules, the nucleolus occupying the centre. In others again, five or more large granules are arranged radially as in a plasma cell nucleus. Many of the nuclei appear greatly distended. As regards the second change mentioned, the presence of the abnormal intranuclear granular material (acidophilic), it seemingly modifies its arrangement in accordance with the position of the hyperchromatic granules. It may form a fine ring of closely packed fine granules surrounding a central chromatic fragment or may lie, in appearance like a plasmodial rosette in miniature, in the centre of the affected nucleus. Again, the granules may assume a more linear formation and project like minute crystals from one or more chromatic bodies, or may lie, scattered indiscriminately in between the fragments. In those cells with two or three nuclei, the abnormal substance was usually present in an equal extent in all the nuclei.

Occasionally the material is spread out on each side of a nucleolus in the form of a butterfly—a type noted by Torres to be more frequent in the Brazilian tissues. Frequently cells are seen containing neither nucleus nor chromatin masses, but show a mass of finely granular acidophilic substance centrally situated suggesting that the foreign substance had persisted after the disintegration of the nucleus.

Of the forty monkeys examined, thirty-nine showed the acidophilic intranuclear inclusions whilst in ten normal monkeys, and in six livers from cases of disease other than yellow fever (blackwater fever, obstructive jaundice, relapsing fever, etc.), no such bodies were found.

It would appear that these " inclusions " are useful from a diagnostic standpoint—provided that the tissues are fixed within a reasonable time after death.

Rabies.—During the year five dogs' brains were sent in for examination for Negri bodies. They all came from stations in Southern Nigeria, namely Port Harcourt, Ijebu Ode, Enugu, Ibadan and Lagos and they were all positive.

In the Medical and Sanitary Handbook, full instructions are given reference the removal and transmission of such material and it is worth noting that where these instructions had been followed the brains arrived in excellent condition. The method of sending the head of the dog, is to be discouraged as on arrival, the brain is usually in a state of diffluence.

The method adopted for examination of the brain is the same as that described in the *West African Medical Journal* for October, 1928. By this technique the hippocampal area can readily be removed and sectioned and a diagnosis made within twenty-four hours. As regards staining, Loeffler's methylene blue decolourised with tannic acid has given excellent results, also giemsa.

Blackwater Fever Tissues.—Post-mortem material from three cases of blackwater fever were received for examination but in only one of these, kindly sent by Dr. McCulloch, Pathologist, Kaduna, were the tissues sufficiently fresh to allow of a careful histological examination to be made. It may be of interest to record the histological findings in this case.

Liver.—Vessels distended, liver cells relatively normal in appearance with the exception of small clusters of necrotic cells scattered throughout the organ. The nuclei of most of the cells stain well, and show clear-cut dark staining nucleoli. Fine acidophilic stippling can be made out in many of the nuclei when stained by Giemsa and is probably a degenerative phase.

The protoplasm of the cells is finely granular like ground glass. Iron-containing pigment is present in the form of various sized granules. A more striking feature is the presence within the protoplasm of dark red-brown or black staining (Giemsa) globules, streaks, and stellate masses—evidently representing the distended intracellular bile-canaliculi.

The larger bile channels appear collapsed. A mild degree of round-cell infiltration is seen in the portal tracts, tending rather to be localised around the bile-ducts.

Kidney.—Vascular congestion. Small areas of round cell infiltration and commencing fibrosis lying immediately subjacent to the capsule.

Glomeruli.—Congestion and round-cell infiltration present. Proliferation of the cells of Bowman's capsule. Pigment granules (biliary) present within the glomerular lumina.

Parenchyma.—Tubules dilated and the lining cells are low in type. Their protoplasm is granular and their edges are irregular. Irregular staining of nuclei and many cannot be discriminated from the granular protoplasm.

Bile droplets can be seen within the cells. The tubular contents vary. In the convoluted portions, a fine network of fibrinous material, with scattered collections of coarse acidophilic granules enmeshed therein, is present. The collecting tubules are packed with acidophilic coarse granules similar to the above.

Spleen.—Extensive haemorrhagic areas present. The endothelial lining of the vessels in the trabeculae show proliferation and appear to merge into an overlay of a homogeneously stained (eosin) substance resembling hyaline in appearance. This material encroaches on the lumina of the vessels causing considerable narrowing thereof. Staining with Giemsa demonstrated the affected vessels in a striking manner in that the substance is stained an intense blue-black colour.

Stain for Iron-pigment.—This was positive in the liver and spleen. In the liver the blue-stained pigment seemed most marked peripherally. In the spleen it was scattered diffusely throughout the pulp tissue as finely granular masses.

Stain for fat.—Negative for liver and kidney but present to a very mild degree in the heart muscle fibres.

Diarrhoea and Dysentery.—In February an investigation was commenced into the causes of these ailments in Lagos.

Through the kindness of the Pathologist, Lagos, all material sent to his laboratory was available for examination and the bacteriological work was done in conjunction with the routine clinical examination.

The original intention was to concentrate at first on amoebic dysentery but Ent. histolytica was found to occur at such irregular intervals that the question of preparing media for culture work was abandoned until a more suitable opportunity. On the other hand there was a steady inflow of cases of bacillary dysentery and of cases where neither Ent. histolytica nor Bact. dysenteriae could be detected.

In 153 cases the stools were plated after macroscopical and microscopical examination. Three McConkey plates were used for each case. A small piece of mucus was selected and spread over the first plate by means of a glass spreader, the same spreader being used for the second plate. The third plate was inoculated from the second by means of a second spreader. This method was found to give a very fair idea of the relative proportions of the intestinal flora.

In seventy-three cases further investigation was abandoned, no colonies being noted which would appear to warrant further work. In a number of cases there was evidence of an upset in the normal proportions of the intestinal flora. In other cases the very normal appearance of the flora suggested malingering.

In eighty cases the investigation was carried further, colonies being fished and tested culturally.

In two cases of Flexner dysentery the organism was recovered post-mortem, in both from the ulcerated intestinal wall, in one from the spleen pulp as well.

The organisms identified were :—

Bact. dysenteriae Flexner	34
Bact. dysenteriae Schmitz	2
Bact. Morgan	8

No cases of Shiga dysentery were found during the period under examination although the organism has been isolated in recent years by Dr. Butler.

Late lactose fermenters were frequent and in view of the work of Dudgeon and Pulvertaft, attention will have to be directed to these organisms as possible causes of repeated attacks of diarrhoea.

One organism isolated in suspicious circumstances is worthy of mention. The patient, a European, reported sick and his stool was available for examination within a few hours of the commencement of the attack. Macroscopically and microscopically the stool was that of a bacillary dysentery. Plating yielded an almost pure growth of the organism in question.

Grown in broth, the organism is a short rod sometimes found in chains. Grown on agar, the organism shows extraordinary pleomorphism even in young cultures. Small coccoid bodies varying in size form the bulk of the culture but large sausage shaped, poorly staining forms are found as well.

Active motility can be seen in broth cultures but several fields may have to be examined before a motile form is found.

The organism is Gram negative, has no fermenting action on carbohydrate media but peptonises milk.

1 cc of a living twenty-four hours old broth culture was injected intraperitoneally into a guinea-pig with no effect.

The patient recovered from his attack within forty-eight hours and no agglutination test appeared to be indicated.

The strain has been preserved.

At first, the only serum available was a stock polyvalent Flexner serum. It was soon found that this had a very limited range in agglutinating the various strains isolated and for the further identification of the Flexner strains, type strains were obtained through the courtesy of the Curator, the National Collection of Type cultures, Lister Institute for the preparation of type sera.

Owing to shortage of rabbits the sera could not be prepared for some considerable time after receipt of the strains. The strains were accordingly subcultured twice daily for a week in nutrient broth before being grown on nutrient agar. The growth was washed off at eighteen hours with .5% phenolised saline and allowed to die out in the ice-chest. Three injections the first consisting of 250 million, the second and third of 500 million organisms each, were made intravenously at intervals of a week. At the end of the third week the rabbits were bled from the ear on three successive days, the sera from the three bleedings being pooled and preserved for use by adding one part of serum to four parts of .625% phenolised saline.

Each of the thirty-four Lagos strains was tested against the five type sera. All strains were passed twice daily through nutrient broth for a few days and then grown on nutrient agar. Emulsions were prepared by washing off the growth with .5% formolised saline and heating at 55°C for half an hour, the emulsions being finally standardised to 500 million organisms per 1 cc.

The range of final dilutions set up was from 1/100 to 1/25600 and agglutination was allowed to go on over night at 55°C, the results being read off at about twenty hours.

The highest dilution showing a trace of granularity seen through a hand lens after quarter of an hour at bench temperature was considered the end point, no notice being taken of any sediment which could be shaken up from the bottom of the tubes.

It was found repeatedly that, in a range of dilutions, precipitation could be observed in the first and second tubes after that tube which was the last to show granularity in the supernatant fluid, the tubes with still higher dilutions and the control tube showing nothing. This may be explained by the possibility that in any one culture, a small percentage of the organisms may have higher intrinsic agglutinating powers than the rest. Another possibility is that there may be group and type agglutinins in the Flexner group, although not so well defined as in the case of the salmonellas. The second alternative cannot be dismissed lightly as it has been observed more than once that an emulsion which gives with one type serum, a clean-cut agglutination (*e.g.* total, standard and nil, or total, subtotal, and trace) will give with another serum a muddy type of agglutination over a range of tubes. As it was evident that, if the last tube showing precipitation were taken as indicating the titre, it would represent the titre of the serum for only a small percentage of the emulsion in question, it was decided to ignore precipitation and consider the appearance of the supernatant fluid only.

To save columns of figures which are difficult to compare, the method of Andrews and Inman in their M.R.C. Special Report No. 42, has been adopted and the results of the serological examination of the thirty-four Lagos strains are set out graphically in the form of spectra, each bar representing the percentage of the titre of a serum for an organism as compared with the titre for the serum's homologous organism.

Of the thirty-four strains, fourteen can be placed in their types at once, strains 46 and 154 belonging to the V type, strains 1, 12, 32, 49, 82, 123 and 131 belonging to the W type and strains 19, 77, 84, 166 and 172 belonging to the Z type.

Seven strains came down to full titre with more than one serum.

Strain 28 agglutinated to 100% with X and Z sera. Absorption of the X serum with strain 28 removed over 90% of its agglutinins for the X organism. Absorption of the Z serum with strain 28 removed only 25% of its agglutinins for the Z organism.

Strain 109 agglutinated to 100% with V and Z sera. Absorption tests did not give such conclusive results as in the case of strain 28, 8.3% of the agglutinins for V remaining in the absorbed V serum and 12.5% of the agglutinins for Z remaining in the absorbed Z serum.

Strains 142 and 144 agglutinated to 100% with the W and Y sera. Absorption tests have not been done.

Strains 87, 107, and 168 proved to be remarkable in that they agglutinated freely with all the type sera, to 100% or over with the V, X, Y and Z sera and to 25-75% with the W serum.

Each type serum was absorbed with strain 168, the titres for the homologous organism after absorption being

V	75%
W	75%
X	25%
Y	37.5%
Z	75%

Should these strains retain their agglutining properties after prolonged subculture, they will prove valuable adjuncts to sero-diagnosis.

Extensive agglutinogenesis and absorption tests will be necessary to determine their antigenic composition. In view of the fact that absorption by strain 168 reduces the homologous titre of the X-serum to a greater degree than in the case of the other sera, it will not be out of place to direct attention to the peculiarity of the X-type, described by Andrews and Inman in that whilst the X-type agglutinates very feebly with heterologous sera, it produces a serum which has a wide range for heterologous types.

SPECTRA OF LAGOS FLEXNER STRAINS SHOWING PERCENTAGE TITRES WITH TYPE SERA.

SHEET I.

50% 100%

Strain 46.

V	100
W	6.25
X	3.1
Y	9.4
Y	50.0

Strain 154.

V	100
W	12.5
X	6.25
Y	25.0
Z	50.0

Strain 1.

V	25.0
W	100
X	6.25
Y	37.5
Z	1.0

Strain 12.

V	25.0
W	100
X	12.5
Y	37.5
Z	1

Strain 32.

V	16.6
W	100
X	6.25
Y	66.6
Z	3.1

Strain 49.

V	6.25
W	100
X	2.1
Y	25
Z	0

Strain 82.

V	12.5
W	200
X	6.25
Y	33.3
Z	1.2

50% 100%

Strain 123.

V	12.5
W	100
X	50.0
Y	25.0
Z	16.6

Strain 131.

V	12.5
W	100
X	25.0
Y	25.0
Z	16.6

Strain 19.

V	25
W	2.1
X	50.0
Y	18.75
Z	100

Strain 77.

V	6.25
W	12.5
X	12.5
Y	8.3
Z	150

Strain 84.

V	9.4
W	4.7
X	50
Y	8.3
Z	150

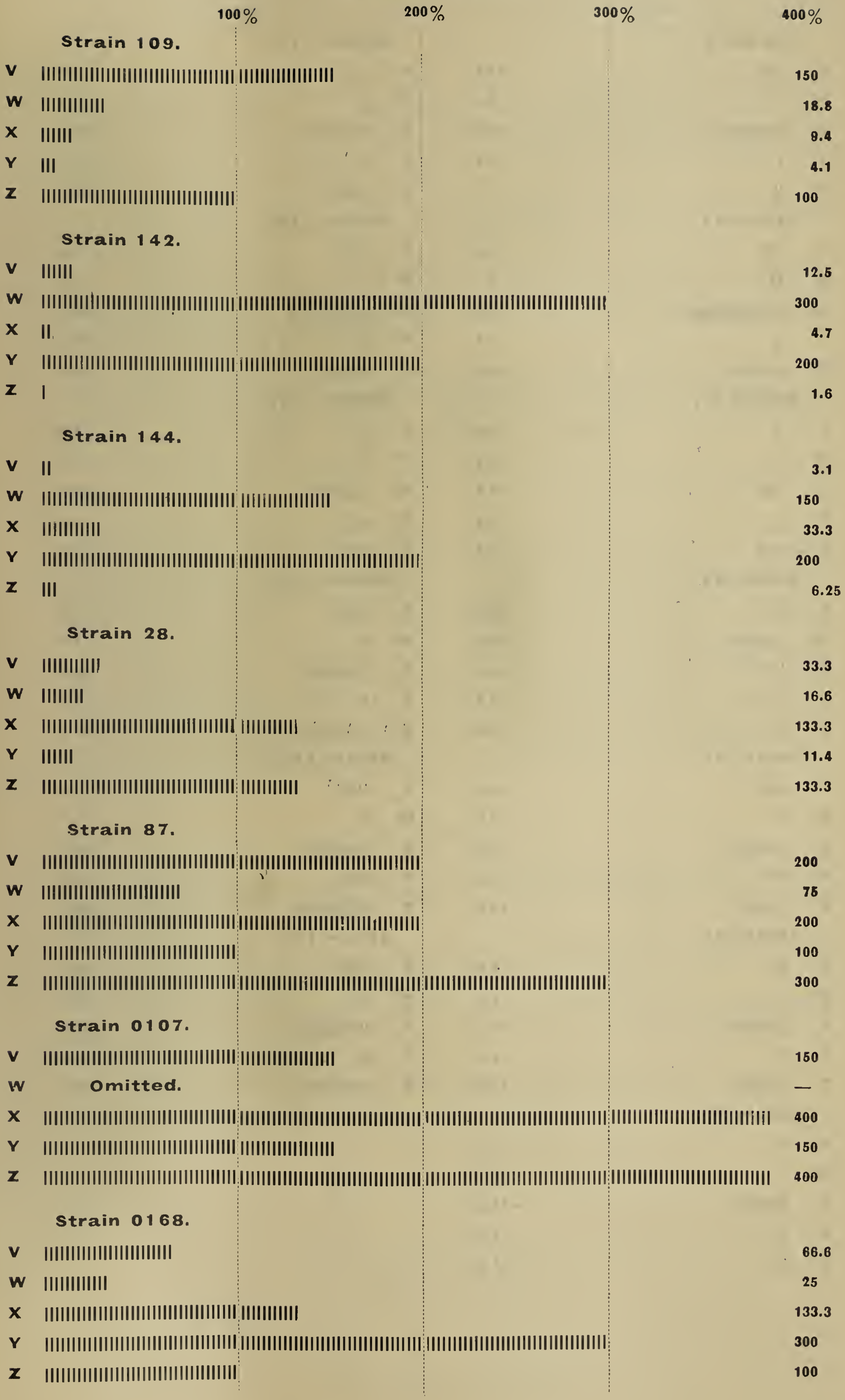
Strain 166.

V	1.6
W	1.2
X	33.3
Y	25
Z	100

Strain 172.

V	1.2
W	1.2
X	33.3
Y	18.8
Z	100

SHEET II.


100%
200%
300%
400%
Strain 109.
V 150
W 18.8
X 9.4
Y 4.1
Z 100
Strain 142.
V 12.5
W 300
X 4.7
Y 200
Z 1.6
Strain 144.
V 3.1
W 150
X 33.3
Y 200
Z 6.25
Strain 28.
V 33.3
W 16.6
X 133.3
Y 11.4
Z 133.3
Strain 87.
V 200
W 75
X 200
Y 100
Z 300
Strain 0107.
V 150
W Omitted. —
X 400
Y 150
Z 400
Strain 0168.
V 66.6
W 25
X 133.3
Y 300
Z 100

SHEET III.

	50%	
Strain 2.		
V	IIIIII	12.5
W	II	4.2
X	IIIIIIIIIIII	25.0
Y	I	1.5
Z	III	6.3
Strain 41.		
V	IIII	8.3
W	O	0
X	IIIIIIIIIIIIIIII	33.3
Y	II	3.1
Z	IIIIIIIIIIII	25.0
Strain 47.		
V	III	6.25
W	I	2.3
X	IIIIII	12.5
Y	I	2.3
Z	IIIII	9.4
Strain 59.		
V	III	6.25
W	IIIIIIIIIIII	25.0
X	IIII	8.3
Y	IIIII	9.4
Z	III	6.3
Strain 91.		
V	IIIIII	9.4
W	II	4.7
X	IIIIIIIIIIII	25.0
Y	II	3.1
Z	IIIIIIIII	18.8
Strain 94.		
V	III	6.25
W	I	1.6
X	IIIIIIIIIIII	25.0
Y	II	4.1
Z	IIIIIIIII	18.8
Strain 97.		
V	II	3.1
W	I	1.2
X	IIIIIIIII	18.8
Y	II	4.1
Z	IIIIII	12.5

	50%	
Strain 111.		
V	III	6.25
W	I	2.1
X	IIIIIIIIIIII	25.0
Y	II	3.1
Z	IIIIIIII	16.6
Strain 113.		
V	IIIII	9.4
W	I	2.1
X	IIIIIIIIIIII	25.0
Y	II	3.1
Z	IIIIIIII	16.6
Strain 117.		
V	III	6.25
W	II	4.2
X	IIIIIIIIIIII	25.0
Y	III	6.25
Z	IIIII	9.4
Strain 129.		
V	IIIII	9.4
W	II	4.2
X	IIIIIIIIIIII	25.0
Y	II	4.8
Z	IIIIIIIIIIIIIIIIIIIIIIII	50.0
Strain 133.		
V	IIIIII	12.5
W	II	4.7
X	IIIIIIIIIIII	25.0
Y	IIIII	6.25
Z	IIIIIIIIIIIIIIII	33.3
Strain 138.		
V	IIIIII	12.5
W	II	4.7
X	IIIIIIIIIIII	25.0
Y	III	6.25
Z	IIIIIIIIIIII	25.0

The thirteen remaining strains agglutinated feebly with the type sera. Only one homologous serum was available, *i.e.*, for strain 59. This had been prepared in the middle of the year when it was found that the polyvalent serum then in use was not proving of much value, and serum 59 itself was put aside for the time being owing to its limited range.

Serum 59 was eventually tested against all the poorly agglutinating strains. Of the twelve heterologous strains only one, strain 41, came down to full titre. The type strains had also been put up against the serum. Type V came down to 33.3%, type W to 8.3% while types X, Y and Z came down to 40.0%.

N.B.—This was the only experiment where broth cultures were used in place of emulsions from agar slopes.

Reference to the table of spectra will show that strain 59 agglutinated with the W serum better than with the other type sera, yet serum 59 has less effect on the W organism than on the other type organisms. The phenomenon is not understood .

Small as they are, the spectra of the other twelve strains are remarkably similar and it is difficult to believe that they can be dismissed as poorly agglutinating strains. Seven of the twelve were isolated in quick succession within a week or two of each other.

It is proposed to make this group the commencing point for further work.

In spite of the small number of strains isolated, there is a strong suggestion of a selective element in the morbidity of the types as regards the native African and the European. The twenty-one cases from which strongly agglutinating strains were isolated included eight Europeans, while only one of the poorly agglutinating strains was from a European.

The number of patients' sera available for tests proved disappointing. Seven sera were tested, the titres varying from 1/80 to 1/320 from the 10th to 16th day. It is hoped when the work is recommenced that it will be possible to follow up each case daily, type the causal organism as rapidly as possible and investigate the development of agglutinins for homologous and heterologous strains.

SUMMARY.

(1) A number of organisms are responsible for the diarrhoeas and dysenteries of Lagos, of which Bact. dysenteriae Flexner constitutes an important part.

(2) Various types of the Flexner bacillus are found, some agglutinating strongly, and some poorly with type sera.

(3) There is reason to believe that the poorly agglutinating strains form a type of their own.

The following is a list of the strains found in the Lagos cases :—

V Strain No. 154, European, October.
W Strains No. 1, „ January.
„ 12, African, February. Died.
„ 32, „ April. Died.
„ 49, „ May.
„ 82, „ June.
„ 123, European, August.
„ 131, African, August.
X Strain „ 28, European, March.
Z Strains „ 19, „ „
„ 84, „ July.
„ 166, „ November.
„ 172, African, December.

VZ Strains No. 46, African, May.
„ 109, „ August.
WY Strain „ 142, „ September.
WXY Strain „ 144, „ „
ZY Strain „ 77, European, June.
Polyagglutinating Strains No. 87, Z and X, African. July. Died.
„ 107, Z and X, African, August.
„ 168, Z, X and V, African, November.

Lagos type, No. 2, African, February. No. 41, European, April.
„ 47, African, May. No. 59, African, May. Nos. 91 and 94, Africans, July.
Nos. 97, 111, 113, 117, 129, 133, Africans, August, 111 and 113 died.
No. 138, African, September.

ADDENDUM.

Through the kindness of Dr. W. M. Scott, Pathological Laboratory of the Ministry of Health, an opportunity was afforded of testing the Flexner strains with absorbed monospecific sera.

A slight rearrangement of the grouping is necessary :—

Strain 28 agglutinates only with a pure X.
Strain 46 should be grouped as a VZ type.
Strain 59 is a W type.
Strain 77 has a slight Y element in addition to its Z element.

Strains 87, 107 and 168 agglutinate with type Z and X, while strain 168 agglutinates in addition with type V. Their wide agglutinative range is probably due to a stray " group " antigen.

Apart from strain 59, now classed as a W type, the poorly agglutinating strains are untouched by monospecific sera though all agglutinate with a Flexner serum rich in " group " agglutinins.

It should be added that the Y strain used for the preparation of the Y serum in these investigations was the Hiss and Russell strain. This accounts for the Y element in strains 142 and 144.

ENTOMOLOGY.

Four hundred and thirty-six collections of mosquito larvae were received for identification during the periods January to March and October to December, from the Medical Officer of Health, Lagos.

The number of different species was fourteen, namely *Aedes argenteus* in 206 collections, *Culex nebulosus* in 153, *Anopheles gambiæ* in 25, *Culex decens* in 14, *Culex thalassius* in 9, *Culex fatigans* in 8, *Culex duttoni* in 3, *Eretmopodites chrysogaster* in 3, and *Culex consimilis*, *Aedes luteocephalus*, *Aedes irritans*, *Aedes longipalpis*, *Aedes occidentalis* and *Lutzia tigripes* in 1 each. Sometimes two or more species occurred in the one collection, namely *Aedes argenteus* and *Culex nebulosus* in 5 collections, *Anopheles gambiæ* and *Culex decens*, in 3, *Anopheles gambiæ* and *Culex thalassius*, *Aedes argenteus* and *Culex fatigans*, *Aedes occidentalis* and *Lutzia tigripes*, and *Culex fatigans*, *Culex nebulosus* and *Culex duttoni* in one collection each.

The sources or receptacles numbered thirty, as follows :—Banana stump, barrel, borrow-pit, bottle, bowl, bucket, canoe, catch-pit, cocoanut shell, cover of typewriter, drain, drum, dustbin, flower-vase, grindstone, gutters, hole in floor, jug, mortar, motor tyre, pan, plate, pool, pot, pump-pit, swamp, tin, treehole, vat and well.

These in their order of apparent attraction were :—Pot, 190; tin, 46; pool, 43; catch-pit, 31; drum, 25; barrel, 24; canoe, 12; drain, 9; pan, 9; well, 7; tyre, 5; bucket, 4; bottle, flower-vase, swamp each 3; bowl, cocoa-nut shell, cover of typewriter, hole in floor, mortar, pump-pit and treehole each in 2, and the remainder in one instance each.

The Entomological Survey of Lagos was continued during 1929.

Survey 41.—East side of Prison Road Obalende. Pool in open grass. *Lutzia tigripes* and *Anopheles gambiæ.*

Survey 42.—Twenty yards in bush from 41. Shade. Sample taken at roots of tree. Corethrine larvæ.

Survey 43.—Ten yards east of 41. *Culex decens.*

Survey 44.—From centre of swamp east of Prison Road. Thick bush. *Anopheles gambiæ.*

Survey 45.—Onikan Swamp 200 yards south of Roman Catholic College. Open brackish pool. *Anopheles gambiæ.*

Survey 46.—Obalende. West of Prison Road. 30 yards south of culvert. Open pool. *Anopheles gambiæ.*

Survey 47.—Thirty yards west of 46. Shaded. Heavy vegetation. *Anopheles gambiæ.*

Survey 48.— Twenty yards west of 47. Open small puddle. *Culex rima.*

Survey 49.—Thirty yards west of 48. Shaded. Pool at root of Mangrove. *Anopheles gambiæ.*

Survey 50.—Thirty yards west of 49. Open pool. *Culex decens* and *Culex ager.*

Survey 51.—Railway yard swamp Iddo. Shade. *Anopheles gambiæ.*

Survey 52.—Obalende from north of road. Open ditch. *Culex consimilis.*

Survey 53.—South side of Obalende Road at first culvert. Shaded. Grass and duckweed. *Culex decens.*

Survey 54.—Fifty yards east of 53. Grass and duckweed. *Culex grahami, Uranotaenia bilineata* v. *fraseri, Mimomyia hispida* and *Uranotaenia annulata.*

Survey 55.—Fifty yards east of 54. Long grass. *Culex decens* and *Uranotaenia annulata.*

Survey 56.—South side of Obalende Road. Ten yards south of second culvert. Grass and duckweed. *Uranotaenia annulata* and *Uranotaenia bilineata* v *fraseri.*

Survey 57.—Twenty yards east of 56. Small pools with duckweed. *Uranotaenia bilineata* v *fraseri* and *Mimomyia hispida.*

Survey 58.—Thirty yards east of 57. Shaded. *Anopheles gambiæ.*

Survey 59.—Twenty yards east of 58. At margin of swamp. *Culex decens.*

Survey 60.—Ten yards east of 59. Grass and duckweed. *Uramotaenia bilineata* v *fraseri, Culex decens* and *Uranotaenia pallidocephala.*

Survey 61.—Thirty yards south east of 60. *Culex ager* and *Uranotaenia pallidocephala.*

Survey 62.—Hundred yards south east of 61. Heavy bush. Unfortunately all larvæ were eaten by a fish before the sample arrived.

Survey 63.—Ten yards from 62. Bush. *Culex decens* and *Uranotaenia pallidocephala.*

Survey 64.—Ten yards from 63. *Anopheles gambiæ, Culex decens* and *Uranotaenia bilineata* v *fraseri.*

Survey 65.—Twenty yards south west of 64. Ditch through swamp. *Anopheles gambiæ.*

Survey 66.—Twenty yards south west of 65. From ditch. *Culex annulioris* and *Culex ager.*

Survey 67.—Ten yards south west of 66. From ditch. *Culex annulioris* and *Culex decens.*

Survey 68.—Ten yards south west of 67. From ditch. *Culex annulioris.*

Survey 69.—Ten yards south west of 68. From ditch. *Culex annulioris* and *Culex ager.*

Survey 70.—Twenty yards south west of 69. Ditch. *Culex annulioris.*

Survey 71.—Thirty yards south west of 70. *Culex annulioris, Culex ager* and *Culex consimilis.*

Survey 72.—South of Obalende. From ditch. *Anopheles mauritianus* and *Culex quasigelidus.*

Survey 73.—200 yards south of 72. Drinking pool at edge of swamp. *Anopheles gambiæ.*

Survey 74.—150 yards south of 73. From small pool at edge of swamp. *Anopheles gambiæ.*

Survey 75.—150 yards west of Prison Road Obalende. Pools at roots of palm trees. *Culex insignis.*

Survey 76.—Thirty yards west of 75. *Culex insignis.*

Survey 77.—100 yards west of Ikoyi Prison. From shaded margin pools. *Culex insignis.*

Survey 78.—Ten yards north of 77. *Culex insignis.*

Survey 79.—Ten yards north of 78. *Culex insignis.*

Survey 80.—Ten yards north of 79. *Culex insignis.*

Survey 81.—Ten yards north of 80. *Culex insignis.*

Survey 82.—Swamp in Railway reservation forty yards from culvert. Water lettuce and grass. *Culex decens* and *Lutzia tigripes.*

Survey 83.—Swamp near Railway reservation. Open puddle. Corethrine larvæ.

Survey 84.—Twenty yards from 83. Shade. *Anopheles mauritianus* and *Culex decens.*

Survey 85.—Twenty yards from 84. Shade. *Culex decens.*

Survey 86.—Swamp north-east of Apapa railway at E.B. reservation. *Culex ager.*

Survey 87.—Alongside 86. *Culex ager.*

Survey 88.—Alongside 87. Shaded. Surface weeds. *Ficalbia malfeyti.*

Survey 89.—Alongside 88. *Culex decens.*

Survey 90.—Railway reservation swamp open. *Culex decens.*

Survey 91.—Railway reservation swamp. *Aedes nigricephalus* and *Anopheles umbrosus.*

Survey 92.—Same as 91. *Lutzia tigripes* and *Culex decens.*

Survey 93.—Same as 92. *Uranotaenia annulata and Culex decens.*

Survey 94.—Railway reservation swamp water cress. *Ficalbia malfeyti.*

Survey 95.—Same as 94. *Ficalbia malfeyti.*

Survey 96.—Same as 95. *Ficalbia malfeyti.*

Survey 97.—Same as 96. Water lilies. *Ficalbia malfeyti.*

Survey 98.—S. W. Eleshin village Ikoyi. Pool at swamp margin covered with green slime. *Culex bitaeniorhynchus.*

Survey 99.—Near Oluwa village Ikoyi. *Culex quasigelidus* and *Anopheles mauritianus.*

Survey 100.—200 yards from new Ijora village. *Lutzia tigripes, Anopheles gambiæ* and *Culex decens.*

Survey 101.—From pool covered with green fungus, brackish. *Culex thalassius* and *Anopheles gambiæ.*

Survey 102.—Open pool in reclaimed sand. Brackish. *Culex thalassius.*

From October to December, 1929, mosquitoes collected from houses in Lagos and Ikoyi were sent in by the Medical Officer of Health. They were :—

Anopheles gambiae	17♂	262♀.
Culex nebulosus	89♂	103♀.
Culex decens	10♂	72♀.
Culex rima	10♂	41♀.
Anopheles pharoensis		9♀.
Anopheles umbrosus		7♀.
Taeniorhynchus africanus		7♀.
Aedes nigricephalus	1♂	6♀.
Aedes irritans		4♀.
Culex consimilis		2♀.
Lutzia tigripes		2♀.
Cyathomyia fusca		1♀.
Taeniorhynchus annetti		1♀.
Culex duttoni		1♀.

These were dissected and the following are the findings :—

Anopheles gambiæ.—Eight with a filarial infection.
Two with sporozoits in salivary glands.
Two with oocysts on stomach wall.

Anopheles pharoensis.—One with oocysts on stomach wall.

As the Anophelines infected with filaria were all collected in the same road a special effort was made to trace the source of infection. Through the kindness of the Medical Officer of Health numbered collections were made and the natives in that district were examined but they were all negative.

A series of collections of larvae were sent out during February by Mr. Brown, European Sanitary Inspector. The adults were *Uranotaenia annulata*, *Uranotaenia bilineata* v *fraser*, *Culex decens*, and *Aedes nigricephalus*.

FEEDING EXPERIMENTS.

Some years ago it was found here that if a mosquito was fed on drawn blood or sugar water, the blood or sugar did not go into the stomach but into the ventral diverticulum. At that time nothing further was done, but last year it was desired to feed *Anophelines* on malarial cultures and feeding experiments were made to find out in what way the mosquito could be induced to take the food presented direct into its stomach.

1st Experiment.—Newly hatched *Aedes argenteus* ♀ put into a tube—the cotton wool plug soaked in sugar water. Dissected immediately after feeding. Diverticulum much distended but no sugar in stomach.

2nd Experiment.—To find out if males acted in the same way a ♂ *Culex nebulosus* put into a tube with net over it and a piece of banana outside the net. Left all night and dissected next day—stomach only with food.

3rd Experiment.—*Taeniorhynchus africanus* ♀ newly hatched put into tube with net and a piece of banana outside, left over night and dissected next day. Stomach full of food.

4th Experiment.—*Taeniorhynchus africanus* ♀ newly hatched put in tube plunged with cotton wool dipped in sugar water—left two days. Stomach full of sugar water, some also in the diverticulum.

5th Experiment.—Newly hatched *Aedes apicoannulatus* ♀ put into tube which was covered with fine chicken skin. Tube lowered into dish containing sugar and blood—the dish resting on a hot plate to keep temperature constant. Killed immediately after feeding. Stomach full of blood and the ventral diverticulum fully distended with blood. The same method was tried with *Aedes argenteus* but the skin was punctured with a No. 1 Entomological pin. On dissection after feeding, the stomach had blood in it though not fully distended, but the diverticulum had no blood.

6th Experiment.—A tube with *An. gambiae* ♀ was covered by a large green leaf, perforated by a No. 1 pin and lowered into sugar and blood. The mosquito fed immediately and both stomach and diverticulum were full.

7th Experiment.—*Culex nebulosus* ♀ in tube covered with a piece of waxed cotton, blood and sugar put on outside of cotton. Mosquito killed and dissected immediately after feeding. Stomach full of blood, a small drop at the base of the ventral diverticulum. Another *Culex nebulosus* ♀ fed through cotton with wax round only the rim. On dissection its stomach showed a little blood, but the diverticulum was full.

Two *Culex nebulosus* ♀ ♀ fed in the same way and kept one day, both showed a small amount of blood in the stomach and a trace in the diverticulum.

8th Experiment.—Fresh rat skinned and the leg skin shaved a little and filled with blood. Suspended in a test tube with newly hatched *Aedes africanus and Eretmopodites chrysogaster* ♀ ♀. One *Aedes* seemed very eager to feed but after being left all day and then dissected, it was found that none of them had fed. As none of these methods were found satisfactory, other experiments are still being tried.

In January Mr. Brown, European Sanitary Inspector, experimented with Paris Green on a swamp. He began on the 8th January and treated it periodically until the middle of February. Samples were taken and sent out for examination very frequently.

		Culicines.		Anophelines.
On 10th January ...		no larvae		—
14th ,, ...		17		1
17th ,, ...		70		3
19th ,, ...		31		1
21st ,, ...		50		5
24th ,, ...		30		—
26th ,, ...		20		—
28th ,, ...		48		—
31st ,, ...		2		—
2nd February ...		2		2
4th ,, ...	1st instar	3	3rd instar	4
	2nd ,,	2		—
	3rd ,,	1		—
	Fully grown	7		—
	Pupa	1		—
7th ,, ...	1st instar	6	1st instar	9
	2nd ,,	1	2nd ,,	9
	Fully grown	2	3rd ,,	1
	Pupa	1		—

	Culicines.		Anophelines.	
9th February ...	Fully grown	2	2nd instar	7
			3rd ,,	5
			Fully grown	3
11th ,, ...	1st instar	3	1st instar	12
	2nd ,,	2	2nd ,,	3
	3rd ,,	5	3rd ,,	5
	Fully grown	3		—
	Pupæ	2		—
14th ,, ...	1st instar	5	1st instar	3
	2nd ,,	1		—
	Pupæ	2		—
16th ,, ...	3rd instar	1	3rd instar	2
	Fully developed	3		—
18th ,, ...	3rd instar	2		—
	Fully grown	2		—
21st ,, ...	Fully grown	3		—

During the year over 7,000 fleas were examined and identified.

BLACKWATER FEVER.

Reports on ten cases of this disease have been received. The months in which they occurred were January two, February four, October two, and December two.

Four cases were reported from the Northern Provinces, three from Zaria and one from Kaduna. Five cases occurred in the Southern Provinces, one at each of the following stations, Abeokuta, Benin, Ibadan, Lagos and Port Harcourt and there was one case in British Cameroons, at Victoria.

There was one female, the remaining nine being male. All were adults, the respective ages being 20, 22, 26, 27, 31, 32, 38, 39, 40 and 43 years.

By occupation, there were two traders, one timber supervisor, one ship's cook, one clerk and one housewife among the non officials, and of officials there was one administrative officer of the Public Works, a foreman of works, a locomotive driver and a lieutenant of infantry.

As regards nationality all were of British birth with the exception of one Greek, one Syrian and one negro.

The mortality was high, there being five deaths. Death was due to suppression of urine in three cases and to syncope in two. The present attack was the first, except in two cases, that of the negro in which it was the second attack and that of the Syrian in which it was also the second attack. The former recovered, the latter died. A short account of each case is given, from which it will be seen that in two cases quinine was certainly not in any way connected with the onset of the hæmoglobinuria.

In case (2) five grains of quinine were taken one week before the onset and in case (5) no quinine had been taken for two weeks prior to the onset. In case (4) the dosage of quinine was minute, in view of the previous history.

The blood was examined in every case except case (6) in which the patient was not seen until the fourth day of illness.

Subtertian parasites were present in case (1) (this case is more fully reported in the *West African Medical Journal* Vol. 3 No. 2 pages 32 and 33), in case (3) on the day before hæmoglobinuria, in case (4) on the first day of hæmoglobinuria, in case (7) two days before the recurrence of hæmoglobinuria and in case (8) on the first day of hæmoglobinuria. In cases (2) and (9) pigmented mononuclear leucocytes were present on the first day of hæmoglobinuria, but parasites were not seen. Neither parasites nor pigment were seen on the first day of hæmoglobinuria in cases (5) and (10). Differential leucocyte counts were done in all save cases (4), (6) and (10) but with the exception of case (1) they did not differ from the usual findings.

Case 1.—Male, age 38. English, Ship's cook. Sixteen years on ships. Sailing between England and West Africa. Admitted having had an attack of malaria eight years previously. Only took quinine when ill. Present voyage six weeks old, with four ports in Nigeria visited. Had been " off colour " with headaches three weeks before. Illness began on 22nd January with temperature of 103°F., persistent vomiting and sleeplessness. Given ten grains quinine by Chief Steward on 22nd and again on 23rd January while at sea. Seen by Medical Officer at Port Harcourt on 24th, temperature 102.4°F., jaundiced, dull and apathetic, and with subtertian parasites in blood. Given intramuscular injection of 10 grains quinine bihydrochloride and two hours later the urine which was passed was black. By the following evening the urine was clear and the temperature normal. On 28th January, a course of quinine was begun starting with two and a half grains twice daily by the mouth, raised next day to five grains twice daily. Recovery rapid. In this case it is presumed that the patient had been passing black water before admission to hospital.

Case 2.—Male, age 32. Greek, trader. Had first come to Nigeria some six years previously and had been resident in Ibadan for one year. He had attacks of fever from time to time and took quinine only on these occasions. On 19th January had a " dose " of fever and took a five-grain tabloid of quinine. On the afternoon of 26th January, in the damp cold after a tornado he felt chilly and passed black water. The temperature remained round about 102°F. for two days, then hovered about 100°F. The urine, clearing slightly diminished in quantity until the end of the fourth day. On the 5th day no urine was passed and death occurred on that night.

Case 3.—Male, age 40. English. Foreman of Works. Had first come to Nigeria in 1920. Had been previously in India for seven years. Resident at Dumba, near Zaria for ten months and had had a number of attacks of malaria. Usually took five grains quinine daily but had taken none for seven days previous to admission to hospital on 30th January, during which period he suffered from fever and vomiting. On admission the temperature was just under 100°F. and subtertian parasites were present in the blood. He was put on five grains quinine four-hourly on 31st January, and took twenty grains in all, that day. On 1st February at 10 a.m., and again at noon he was given ten grains of quinine; he passed black water at 3.30 p.m. after a rigor lasting half-an-hour, the temperature rising suddenly to 103°F. and falling as suddenly to normal, round about which it remained. The urine cleared on the third day, but only small amounts were passed, from three to eight ounces per day until the thirteenth day, when a fatal attack of cardiac syncope occurred.

Case 4.—Male, age 26. Sierra Leonean. Bank clerk. Had been in Nigeria since early boyhood. Had a previous attack of blackwater fever in August, 1927, which lasted three days and was mild in character. Since then he had taken no quinine. On 18th February, he consulted a Medical Officer, complaining of fever and weakness of several days' duration. Subtertian malarial parasites were found in the blood and he was given 1.2 grains quinine the same evening. Next morning he was given a similar amount and a few hours later he passed black water The temperature was 102.6°F. and he felt weak. The hæmoglobinuria lasted one day, the temperature became normal at the end of the second day and recovery was rapid. Previous to his first attack of blackwater fever, he had on occasions taken five grains of quinine without untoward effects.

Case 5.—Male, age 31. English. Lieut., R.W.A.F.F. First came to Nigeria in 1925. Served eighteen months, proceeded on leave and had served fifteen months at Kano when present attack occurred. For the previous fortnight he had been on manoeuvres in the " bush " near Zaria and had taken no quinine. Although he had had a number of attacks of malaria he did not take quinine regularly. There were apparently no premonitory signs. He woke at about midnight of 20th February, vomited and passed urine which was dark-red, after which he returned to bed and slept. He was admitted to hospital in the morning of 21st February, the temperature on that day and for the next two days varying between 101° and 103°F. The urine cleared slightly, eighty to ninety ounces were passed daily, but he died on the fifth day.

Case 6.—Male, age 22. Scottish. Timber supervisor. First visit to tropics. Had been in Nigeria thirteen months during which time he had " fever on and off ". He was careless in his habits, irregular with quinine and had holes in his mosquito curtain. He lived at Nikrowa, Benin district in a damp swampy forest area. He had had malaise, vomiting and fever for three days, during which he did not see a Medical Officer but dosed himself with twenty grains quinine each day. Black water appeared on 24th February and he continued to take five grains quinine daily until calling in a Medical Officer on 28th February. He was very ill and collapsed then, but the urine had cleared and he made a slow but complete recovery.

Case 7.—Male, age 43. English. Public Works. Fifteen years in West Africa; seven on Gold Coast, eight in Nigeria. Has had frequent attacks of " biliousness with fever ", and took five grains quinine daily except during these attacks, but after each attack he took ten grains daily for a few days. During his present tour of five months has had many such attacks, and had three during the three weeks preceding present illness. On 2nd October had " bilious attack " and on 3rd and 4th October took ten grains quinine hydrochloride at 8 p.m. Felt shivery and seedy during night of 4th and at 6.45 a.m. on 5th, passed reddish urine. He was at once removed to hospital, where his temperature was found to be 100°C. A specimen of urine passed at 9 a.m. contained methæmoglobin but subsequent specimens were clear and the temperature was normal by evening. Thereafter the patient appeared comfortable and well until 12th October, when the temperature rose to 100°C. On 13th October the temperature reached 101° and blood examination revealed the presence of subtertian parasites. He was given one grain quinine by mouth on 12th October, five grains on 13th, and five grains twice on 14th October. On 15th October, at 10 a.m., he was given six grains quinine bihydrochloride intramuscularly. At 5.20 p.m., the urine passed was the colour of port wine, the temperature later shooting up to 104.2°C. Thereafter the urine became very scanty, did not clear, the temperature remained febrile and he died on 22nd October.

Case 8.—Female, age 27. Scottish. Wife of African. Arrived in Nigeria, August, 1928, and lived in Abeokuta until present illness in October, 1929. She used a mosquito-curtain and mosquito boots but took quinine only when feeling seedy. During the last two months had considerable " low fever ". After a fortnight's abstinence from quinine she felt off colour and took five grains quinine hydrochloride on evening of 7th October. The dose was repeated at 9 a.m. on 8th October after a night of shivering, and at 2 p.m. black water was passed. The temperature remained round about 101°C. for four days, the hæmoglobinuria disappeared in three days but the convalescence was slow.

Case 9.—Male, age 20. Syrian. Trader. Born in Nigeria. Traded mostly in Calabar and in Victoria. Had a previous attack of blackwater fever (date not stated) of a mild character. Malarial attacks were frequent and quinine was only taken during these. Felt seedy on 21st December and took five grains quinine at noon and again at 6 p.m. At 7, next morning, passed black water. The urine cleared on the third day but was passed in very small quantities, from one ounce to nine ounces. No urine was passed after noon on the 4th day and he died in the evening of the 5th day.

Case 10.—Male, age 39. English. Engine driver. Had been three years in Nigeria, his present tour having lasted five months. There was no history of malaria, and he was irregular in quinine prophylaxis. He felt out of sorts on 23rd December, and took fifteen grains quinine at

2 p.m. At 10.30 p.m., he passed dark urine, following a rigor an hour previously. The temperature was 101°F. on 24th December, but fell to normal in the evening and remained so. The urine cleared on 25th December. The illness was comparatively mild except for severe anaemia and recovery was uneventful.

NEOPLASMS.

Through the kindness of members of the Staff, and private practitioners, seventy-six specimens of tumour tissue have been received for examination.

In the majority of cases they were accompanied by good clinical notes though it is still necessary to stress the importance of these when sending in tissues, and also to urge the need for correct preservation according to the instructions contained in the Medical and Sanitary Handbook (1928), page 71, paragraph A.

The following analysis amply demonstrates the great variety and wide distribution of the specimens examined and, small though the numbers be, serves to attract attention to the protean manifestations of neoplastic disease among the natives of Nigeria.

Benign or simple tumours. A total of twenty-eight examined.

Adamantinoma	of lower jaw	2
Adenoma	of female breast ...	2
Cystadenoma	of orbit	1
,,	of thyroid	1
Epulis	of lower jaw	1
Fibroma	of forehead	1
,,	of finger	1
,,	of jaw	1
,,	of scapular region ...	1
,,	of thigh	1
,,	of uterus and ovary ...	1
Fibro-myoma	of uterus	1
Hæmangioma	of spleen	1
,,	of ?	1
Lipoma	of thigh	1
Neurofibromatosis (von Recklinghausen's disease)		1
Osteoma	of tibia	1
Papilloma	of larynx	1
,,	of scalp	1
,,	of axilla...	1
Polypus	of rectum with associated schistosomiasis ...	1
,,	of rectum (cyst-adenomatous type)	1
,,	of uterus	1
Simple cyst	of salivary gland ...	1
,,	of temple	1
Simple myeloid tumour (benign giant-cell sarcoma)	of femur	1

The benign tumours with one or two exceptions do not present any features of particular interest. All occurred in native Africans with the exception of a simple papilloma of the axilla which was obtained from a European. Polypi, though strictly local hyperplasia of tissue, are included amongst the simple tumours. Adamatinoma should, perhaps receive mention as being a comparatively rare tumour with a tendency to local recurrence and invasion of neighbouring structures. The cystic type is more common in the lower jaw whilst the more solid and more malignant type usually springs from the upper jaw. These tumours are said to be derived from paradental epithelial debris or from the enamel organ and Ewing (1) states that they may, in successive recurrences, change from an adult acanthoma through an adenomatoid growth to a highly malignant tumour composed of closely packed, indifferent round and polyhedral cells. Adamantinoma appears to be met with fairly frequently in Nigeria.

MIXED TUMOURS.

Mixed tumour of parotid gland	5.
Mixed tumour of neck	1.

These tumours, common among the natives of the country, do not fall easily into either the benign or malignant group but should be regarded as potentially malignant. Of the six specimens received, one, from the parotid gland, showed definite carcinomatous change. It is not certain that the mixed tumour of the neck mentioned above was not also of parotid origin.

Malignant Tumours.—Total of forty-two examined.

1. *Carcinomata.*

Squamous carcinoma (epithelioma)	of scrotum	1
,, ,,	of heel	1
,, ,,	of cervi uteri	1
,, ,,	of neck	1
Adeno-carcinoma	of parotid gland	1
,,	of liver	4 (one biliary in origin.)
,,	of female breast	2
,,	secondary in a gland ...	1
,,	of ?	1
Myxo-adeno-carcinoma	of anterior triangle of neck	1
,, ,,	of palate	1
Solid or diffuse carcinoma	of orbit	1
,, ,,	of bladder	1
,, ,,	of female breast	2
,, ,,	of liver	1
,, ,,	secondary in abdominal gland	1
,, ,,	cervi uteri	1
Pre-cancerous condition	in chronic mastitis ...	1

2. *Endotheliomata.*

Angio-endothelioma	of skin	1
,,	of erector spinæ muscle ...	1
Cylindroma	of orbit	1
Endothelioma	of gland	1

3. *Sarcomata.*

Round-cell sarcoma	of neck	1
,, ,,	of abdomen	1
,, ,,	of male breast	1
,, ,,	of gall-bladder	1
,, ,,	of scalp	1
,, ,,	of orbit	1
Spindle-cell sarcoma	of arm	1
,, ,,	of tibia	1
,, ,,	of abdomen	1
Lymphosarcoma	of axilla	1
,,	of neck	2
Gliosarcoma	of orbit	1

4. *Melanomata (melanotic sarcoma.)*

Melanoma	of groin	1
,,	of skin (region not specified)	1

Of the malignant tumours in the above analysis all, save two, occurred in native Africans. The squamous carcinoma of the neck and the pre-cancerous changes in a chronic mastitis were from Europeans. Ewing (2) stresses the importance of the latter condition as regards the treatment to be adopted in cases of chronic cystic mastitis. The necessity for a biopsy and careful histological examination must be emphasised.

MALIGNANT DISEASE IN THE NATIVE POPULATION.

The study of malignant disease among so-called primitive races is an absorbing one and is as yet in its infancy. This country with a population of some nineteen millions cannot fail to provide an excellent field for such work and it is to be hoped that cancer research will not be neglected here.

The present state of development of Nigeria is not such as to permit of reliable statistics regarding the incidence of malignant disease among the indigenous population, though with the general opening up of the country, the building of hospitals and dispensaries, the increase of medical staff, and above all, the growth of confidence of the native in Western methods, this state of affairs will rapidly change.

The long cherished theory of a low cancer incidence in primitive races by reason of their more simple diet and natural mode of living would appear to be very wide of the true state of affairs.

Dietetic research is likely to prove that the food of the native, though simple, is in many cases unsuitable, and, as for his mode of living, it may indeed be natural but it is certainly far from conducive to health in the majority of primitive communities.

One cannot in this short discussion presume to give a detailed account of the various manifestations of malignant disease which appear in the above analysis of specimens received during the year, nor would it serve any useful purpose to do so here.

Attention may, however, be drawn to certain salient and interesting points which are brought out by the analysis.

(1) The great variety of malignant neoplasms represented in such a small number of specimens.
(2) The high percentage of diffuse carcinomata, *i.e.*, tumours of a very malignant character.
(3) The relatively large number of liver cancers, representing 11.9% of the total malignant tumours.

The subject of liver cancer among the natives of this country has received some attention in previous Annual Medical and Sanitary Reports. Ramsay (3) (1928) suggests that valuable and interesting results may be obtained by a pathologist and bio-chemist working in collaboration.

The relation of these tumours to cirrhotic changes in the liver is a remarkably constant one.

The occurrence of malignant disease in children and adolescents also merits some attention, and one is led to believe, by a study of the records of this institute over a period of some years, that the incidence is unusually high in this country.

A plea may here be put forward not to omit mention of the age of the patient when sending in specimens of tumour tissue for examination.

Of the malignant tumours recorded in the above analysis the following were mentioned in the accompanying clinical notes as having occurred in children:—

(1) Adeno-carcinoma of parotid. Child aet ...	15	years.
(2) Round-cell sarcoma of abdomen. Child aet	6	,,
(3) Adeno-carcinoma of liver (biliary). Child aet	6	,,
(4) Round cell sarcoma of orbit. Child aet ...	8	,,

REFERENCES.

(1) Ewing Neoplastic Diseases, 2nd edition, page 47.
(2) Ewing Neoplastic Diseases, 2nd edition, page 489 *et seq.*
(3) Ramsay, G. W. St. C., Medical and Sanitary Report, Nigeria, 1928, page 70.

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